IMMUNOCOMPETENT MOUSE MODEL FOR TRACKING CANCER PROGRESSION

SUMMARY

transgenic mice having immunocompetent rat growth hormone-firefly Luciferase-enhanced green fluorescent protein.

REFERENCE NUMBER

E-173-2010

PRODUCT TYPE

- Research Materials

KEYWORDS

- Mouse model
- Rat growth hormone
- Firefly Luciferase
- Green fluorescent protein
- Achondroplasia
- Bioimaging
- Screen for performance-enhancing drugs
- Immunocompetent

COLLABORATION OPPORTUNITY

This invention is available for licensing.

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DESCRIPTION OF TECHNOLOGY

The National Cancer Institute's Laboratory of Cancer Biology and Genetics seeks interested parties to co-develop transgenic mice having immunocompetent rat growth hormone-firefly Luciferase-enhanced green fluorescent protein.

The technology is a transgenic mouse model tolerized to firefly Luciferase (ffLuc)- and enhanced green fluorescent protein (eGFP)-labeled tissue whilst maintaining normal immune function. Luc and eGFP are the most frequently used bioimaging markers to track cancer progression in pre-clinical mouse models. As these markers are immunogenic, their reporter activity becomes diminished over time and so their

use has largely been limited to immunodeficient mice. However, immune function is crucial for tumor development and progression, making the use of immunocompetent mice more desirable.

The immunocompetent mouse model described in this invention was generated using the rat growth hormone gene promoter (rGH) to target ffLuc-eGFP fusion gene expression to the pituitary gland, restricting any resulting interfering reporter signal within the head. This allows the tracking of cancer progression throughout the body, where the reporter activity of introduced ffLuc/eGFP-labeled tumors is maintained, despite normal immune function. These immunocompetent rGH-ffLuc-eGFP transgenic mice can be used as hosts in cancer models, allowing long-term in vivo monitoring of the progression of ffLuc/eGFP-labeled tumor cells in the body, which may lead to more clinically relevant insights into cancer progression, metastases and response to therapies.

POTENTIAL COMMERCIAL APPLICATIONS

- In vivo model for studying tumor progression and testing anti-cancer therapeutics using ffLuc or eGFP labeling for bioimaging
- Used to screen growth-hormone stimulating drugs for treating Achondroplasia (dwarf syndrome) or as a test for illegal performance-enhancing drugs

COMPETITIVE ADVANTAGES

- A more clinically relevant in vivo model of cancer progression for testing anti-cancer therapeutics
- A novel pre-clinical immunodeficient mouse model that better tracks tumor development and progression.

INVENTOR(S)

- Chi-Ping Day, PhD (NCI)

DEVELOPMENT STAGE

- Prototype

PUBLICATIONS

1. Day CP, et al. Preclinical therapeutic response of residual metastatic disease is distinct from its primary tumor of origin. Int J Cancer. 2011 Feb 10. [Epub ahead of print]
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4. Latta-Mahieu M, et al. Gene transfer of a chimeric trans-activator is immunogenic and results in short-lived transgene expression. Hum Gene Ther. 2002 Sep 1;13(13):1611-1620. [PMID: 12228016]
5. Stripecke R, et al. Immune response to green fluorescent protein: implications for gene therapy. Gene

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6. Liao CP, et al. Mouse models of prostate adenocarcinoma with the capacity to monitor spontaneous carcinogenesis by bioluminescence or fluorescence. Cancer Res. 2007 Aug 1;67(15):7525-7533. [PMID: 17671224]

PATENT STATUS

- **Not Patented:** none
- **Not Patented:** none

THERAPEUTIC AREA

- Cancer/Neoplasm